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10/709,138

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Kei MURAYAMA

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

12/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/709,138

Applicant(s)

MURAYAMA, KEI

Examiner

Katherine A. Bareford

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.
- claims 2,5,6, 8, 9, 11 and 12 are canceled*

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment of October 22, 2007 has been received and entered. With the entry of the amendment, claims 2, 5, 6, 8, 9, 11 and 12 are canceled, and claims 1, 3, 4, 7 and 10 are pending for examination.

Claim Objections

2. The objection to claims 3, 4, 7, 9 and 10 because of informalities as to the preamble of the claims is withdrawn due to the amendments of October 22, 2007 to correct these issues.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3, 4, 7 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 1, lines 15-17 has been amended (by way of the June 5, 2007 RCE) to read "... thereby, the step of forming a solder resist pattern on the space portion is omitted by forming the oxidizing agent". The Examiner has reviewed the disclosure as originally filed and finds no teaching of specifically omitting formation of a solder resist pattern. Therefore, it is new matter to claim the negative limitation of omitting formation of a solder resist pattern.

The other dependent claims do not cure the defects of the claims from which they depend.

5. In the amendment of October 22, 2007, applicant argues that support is provided in the specification at paragraph [0005], which discusses a short circuit problem in the prior art in which solder resist is not formed, and the present inventor addresses this problem by selectively applying an oxidizing agent in the space portion between the electrodes where the distance between electrodes is smaller than 30 microns. The Examiner has reviewed these arguments, however, the rejection is maintained. At best, paragraphs [0005] – [0007] of the specification indicate that in the prior art, it is known to plate without solder resist on an area where copper electrodes are arranged by plating onto copper electrodes activated by palladium catalyst by electroless plating. However, this indicates the previously known omission of solder resist in some cases of electroless. This does not indicate that in the present invention, the oxidizing agent is plated to the space portions, "thereby, the step of forming a solder resist pattern on the

space portion is omitted by forming the oxidizing agent". In other words, there is no indication that resist is omitted due to or because of the oxidizing agent, and there is no indication in the body of the present case that resist is necessarily omitted when performing the present invention with its application of oxidizing agent either.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1, 3, 4, 7 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 12-15, claims "... the distance between the electrodes of the conductive pattern in the space portion between the electrodes has a plurality of different values, the oxidizing agent is selectively coated in the space portions in which the distance between the electrodes is smaller than ...". This is confusing as worded, because "the space portion" as originally referred to refers to ALL the space between electrodes, as the "distance between electrodes in the space portion ... has a plurality of different values" and in the later use of "the space portions" apparently individual areas and distances are referred to. The use of the term "the space portions" indicates antecedent basis back to the original "space portion". Therefore, it is confusing as to what scope is intended by the term "the space portions".

The other dependent claims do not cure the defects of the claims from which they depend.

8. In the amendment of October 22, 2007, applicant argues that they have corrected the indefiniteness by clarifying that the oxidizing agent is selectively coated in the space portions in which the distance between the electrodes is smaller than 30 microns, which corresponds to minimum line width of solder resist. The Examiner has reviewed these arguments, however, the rejection is maintained. As discussed in the rejection above, the problem is that "the space portion" is being used to refer to two different kinds of space, which is what is confusing. A clarifying amendment would be for, example, that "... the oxidizing agent is selectively coated in parts of the space portion[[s]] in which the distance between the electrodes is smaller than ...". "... selectively coated [[in]] to coat all parts of the space portion ... " could be used if all parts less than 30 microns are to be coated (if there is support in the originally filed disclosure).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 3, 4, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US 5167992) in view of the admitted state of the prior art, EP 837 623 (hereinafter '623) and Miller (US 4668533).

Lin teaches a method of electroless plating. Column 1, lines 5-10. A substrate is prepared that has an insulating body and a conductive pattern formed on the insulating body. Column 3, lines 45-55 and column 4, lines 30-50. The substrate is to be used for microelectronic interconnect substrates or circuit boards (that is, a wiring substrate). Column 3, lines 45-55. A catalytic metal serving as a catalyst of an electroless plating process is adhered onto the insulating body and the conductive pattern. Column 5, lines 35-60. An oxidizing agent, which can oxidize the catalytic metal and make the catalytic metal in an inactive state to the electroless plating is applied to the catalytic metal. Column 5, line 60 through column 6, line 20 and column 7, lines 25-35. It would be applied in a space portion S between the conductive pattern features (as it is shown being applied to the entire surface). Column 5, line 60 through column 6, line 20. Then a metal layer is selectively formed on the conductive pattern by electroless plating. Column 6, lines 20-30.

Claim 4: the adhering of the catalytic metal onto the insulating body and the conductive pattern includes coating an activating solution containing ions of the catalytic metal to deposit the catalytic metal by an oxidation reduction reaction. Column 5, lines 50-60 and column 7, lines 20-25.

Claim 7: the catalytic metal is palladium. Column 5, lines 45-60. The metal formed by electroless plating can be a nickel layer. Column 6, lines 20-40.

Claim 10: the oxidizing agent can be sulfuric acid (H_2SO_4). Column 7, lines 20-30.

Lin teaches all the features of these claims except that (1) the conductive pattern includes electrodes to be used with connection pads, (2) the space portion between the electrodes has a plurality of different values, (3) that the oxidizing agent is coated selectively so that the oxidizing agent is formed selectively in the space portions which are smaller than 30 microns, out of the space portion between the electrodes, to prevent short circuits and omit resist, (4) the ink jet application of the oxidizing agent (claim 3).

The admitted state of the prior art teaches that when forming wiring substrates with conductive patterns, it is well known for the wiring patterns to include electrodes formed of copper which then are overplated to enhance reliability, and the electrodes form connections to the electronic parts. See paragraphs [0002] – [0008] of the specification. It is also well known for the pitch of the copper electrodes on the wiring substrate to be narrowed to 60 microns or less. See paragraph [0004] of the specification. It is also well known for the space portions between the copper electrodes to vary over the substrate. See paragraph [0006] of the specification. It is also well known to desire to form a nickel layer selectively on the copper electrodes by electroless plating. See paragraphs [0002] – [0008] of the specification. This electroless plating provides plating without using solder resist. See paragraphs [0002] – [0008] of the specification.

'623 teaches that it is well known to overplate by electroless plating selectively over conductive patterns on a insulating substrate when making printed circuit boards, for example. Column 1, lines 1-10 and column 4, lines 35-45. The overcoating can be nickel based resistors. Column 7, lines 1-15. '623 provides providing a conductive circuit pattern on the insulating substrate. Column 4, lines 35-55. Then the surfaces of the conductive pattern and the substrate are activated. Column 4, lines 50-55 and column 6, lines 30-45. Then '623 provides applying a plating mask onto the activated substrate so that the areas to be plated are defined in a negative manner, where the plating mask covers all or substantially all of the surfaces except for the resistor areas to be plated. Column 6, lines 45-55. The area to be plated can be partially over the conductive pattern and partially over the insulating substrate. Column 6, lines 50-56. Then, electroless plating occurs, with plating occurring only on the areas not covered by the mask. Column 7, lines 1-15. The exact size of the resistor area to be plated can vary. Column 7, lines 20-30.

Miller teaches ink jet printing as a method to apply materials for electroless plating in a selective form, such as the sensitizers and activators. Column 2, lines 40-50, column 3, lines 45-60 and column 4, lines 15-30. The substrate can be an active integrated circuit. Column 3, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) (2) modify Lin to provide that the conductive pattern includes electrodes spaced different distances apart and that these electrodes can be less

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than 60 microns apart as suggested by the admitted state of the prior art in order to provide a desirable circuit and microelectronic pattern because Lin teaches forming conductive patterns on insulating substrates for circuit and microelectronic usage, and the admitted state of the prior art teaches that conductive patterns on wiring substrates for such purposes conventionally have copper electrodes spaced different distances apart and that the electrodes can be less than 60 microns apart. It further would have been obvious to perform routine experimentation to optimize the distance apart to less than 30 microns apart in at least some cases as the admitted state of the prior art provides that less than 60 microns apart is conventional, and 30 microns is included in the range of less than 60 microns. As to the electrodes being on which connection pads of an electronic part are connected, the admitted state of the prior art teaches that the electrodes are used to provide connection to the electronic parts, and thus would connect with connecting devices or "pads" on the electronic parts. (3) (4) It further would have been obvious to modify Lin in view of the admitted state of the prior art to apply the oxidizing agent selectively to the non electrode portions (so that not all of the non-electrode portions are contacted with oxidizing agent) by a method such as ink jet printing as suggested by '623 and Miller in order to provide a further desirable selective overplating, as Lin in view of the admitted state of the prior art teaches to apply oxidizing agent to an entire surface so that non-conductive surfaces are not coated and '623 teaches that when overplating, there are times when it is desired to have coating over some of the non-conductive areas as well, and Miller provides a desirable method

for selectively applying materials for electroless plating to particular parts of the substrate is by ink jet printing. As this method would apply oxidizing agent in a predetermined pattern to some parts of the non-conductive surface and not apply oxidizing agent to other parts, oxidizing agent would be formed selectively in the space portions, which portions are smaller than a predetermined dimension, out of the space portion between the electrodes as claimed. As well, the oxidizing agent would be coated in a portion which is smaller than the overall "space portion" (all the areas between all the electrodes), because some space portion would not be coated with oxidizing agent. As to the oxidizing agent being selectively coated in areas between the electrodes of the conductive pattern that are less than 30 microns, one of ordinary skill in the art would optimize where to provide the overplating based on the specific use of the substrate desired, as '623 shows, for example, the plating of layers in desired particular areas of the substrate, and it would be obvious that some of the areas not plated would include areas of less than 30 microns, as all of the areas are not overplated. The use of the oxidizing agent as claimed would also provide for omitting the use of a solder resist, as the pattern is formed with oxidizing agent, and the admitted state of the prior art teaches that the electroless plating can be formed without solder resist. As to the prevention of short circuits, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. &

Inter. 1985). The application of the oxidizing agent is what "prevents short circuits", therefore, providing the application of the oxidizing agent as suggested by the combination of the Lin, the admitted state of the prior art, '623 and Miller would also prevent short circuits.

11. The rejection of claims 9 and 11 under 35 U.S.C. 103(a) as being unpatentable over EP 837 623 (hereinafter '623) in view of the admitted state of the prior art is withdrawn due to the cancellation of claims 9 and 11 in the amendment of October 22, 2007.

Response to Arguments

12. Applicant's arguments filed October 22, 2007 have been fully considered but they are not persuasive.

Applicant argues, as to the rejection of claims 1, 3, 4, 7 and 10 using Lin in view of the admitted state of the prior art, '623 and Miller, that in response to the Examiner's statements at page 15 of the Office Action (apparently referring to the July 20, 2007 Office Action), claim 1 has been amended to recite that the oxidizing agent is selectively coated in the space portions in which the distance between the electrodes is smaller than 30 microns in order to prevent short circuits, and furthermore, that the phrase in amended claim 1, "oxidizing agent is selectively . . . by forming the oxidizing agent" is not taught, mentioned, or suggested by any of the cited references.

The Examiner has reviewed these arguments, however, the rejection is maintained. As discussed in the rejection above, the oxidizing agent application, as worded in the claims, can be such that the oxidizing agent is "selectively" coated (meaning a choice is made as to whether to coat in that area or not) in the space portions in which the distance between the electrodes is smaller than 30 microns. This is suggested by the combination of the art as discussed in the rejection above. As to do so "in order to prevent short circuits", the Examiner has noted that the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The application of the oxidizing agent is what "prevents short circuits", therefore, providing the application of the oxidizing agent as suggested by the combination of the Lin, the admitted state of the prior art, '623 and Miller would also prevent short circuits. That the application of the oxidizing agent is to prevent short circuits also appears to raising the issue of the intended use of the invention, and a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, as noted previously, the application of the oxidizing agent is what "prevents short circuits", therefore, providing the application of the oxidizing agent as suggested by the

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combination of the Lin, the admitted state of the prior art, '623 and Miller would also prevent short circuits, as the structure that prevents short circuits is now present. As to the argument that the features of "oxidizing agent is selectively coated . . . by forming the oxidizing agent" is not taught, mentioned or suggested in any of the cited references, the Examiner has addressed the reasons why all of these features of claim 1 are suggested by the combination of the cited art, and applicant has provided no specific argument against the rejection in this section. Thus, applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date

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of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER